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ABSTRACT

While Jean Piaget's work as it relates to the development of childhood and adolescent cognition has long been explored, only recently has the usefulness of Piaget's theory in the study of adult cognition been studied. Recent research by educational psychologists has raised serious doubts about Piaget's theoretical position that the highest level of cognition or formal operational thought is achieved by adolescence and maintained as static over life-span. John Flavell, a leading interpreter of Piaget, has suggested that adult cognitive changes, unlike childhoold cognitive development, which is based on biological events, have their source in experience. Differences in rate and intensity of cognitive development in adulthood result from varying experiences with various degrees of intensity for adults. Evidence from studies of college students has challenged the theory that the final stage of cognitive development is fully achieved at adolescence. Researchers have also investigated the phenomenon of reverse decalage in older persons (a suggestion that formal operations among the elderly follow a pattern of decline in the same order in which they were acquired in the early years). Studies in this area have yielded conflicting results. (YLB)

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ADULT COGNITIVE DEVELOPMENT À LA PIAGET

By Ruth Graham May

ABSTRACT

Many researchers have attempted to verify and refine Jean Piaget's cognitive developmental theory, especially as it relates to the reading process among young children and adolescents. One of the major assumptions of Piagetian theory is that the highest level of cognition or formal operational thought is achieved by adolescence and is maintained as static over the life-span. Only recently have educational psychologists reported studies which raise serious questions about Piaget's theoretical position. The same recent research may be helpful also in contributing to the development of a cognitive theory that actually addresses life-span development.

Challenging Piagetian theory, investigators have studied college students. While the studies are limited in scope, evidence would offer serious challenge to the theory that the final stage of cognitive development is fully achieved at adolescence. A few researchers have also investigated the phenomenon of reverse decalage in older persons--the suggestion that formal operations among the elderly follow a pattern of decline in the same order in which those operations were acquired in the early years. Studies in this area yield conflicting results, thus emphasizing a need for further controlled research on adult cognitive development, including some well-designed longitudinal studies.

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ADULT COGNITIVE DEVELOPMENT À LA PIAGET

Ruth Graham May

The cognitive development theory, first proposed by Jean Piaget and his colleagues as early as 1927, appears increasingly to be the focus of literature related to the reading process. One of the major assumptions of Piaget's theory, as Walter Loban (1) so ably described in today's General Session at this Conference, is that intellectual functioning is an organized affair--the individual is constantly assimilating and accomodating stimuli from the outside world in an effort to give order and equilibrium to his life or to make meaning out of existence.

Piaget's View of Cognitive Development

Piaget's work, as it relates to the development of childhood cognition, has long been explored. Though recognition of his ideas as theory founded securely on research with young children is widespread, little work has been done to trace the development of cognition beyond adolescence. But during the 1960's educational psychologists and others began to explore the possibility that Piaget's theory might be useful in the study of adult cognition. And in the last decade, educators and gerontologists have raised questions about Piaget's theoretical position that the highest level of cognitive development is achieved by age 15. It is only recently that a limited number of empirical studies has been done on adults.

Because Piaget's theory was well researched and the stages of development were purported to develop sequentially, the theory has been used to explain adult cognition, based on the assumption that once developed, cognition remains intact into and throughout adulthood. However, research has stimulated interest in both the question of the actual development of adult cognition by adolescence, and its maintenance over varying periods of time and experience. For those professionals engaged in the teaching-learning of adults, it is not only critical to evaluate the questions raised but also to possibly consider searching for a cognitive theory that addresses life-span development.

Piaget's well-known cognitive developmental theory states that the individual moves through four qualitatively different developmental periods. The first, from birth to two years, is the Sensory-Motor period, during which object permanence is acquired; this stage serves as a foundation for the beginning of language. Period two, the Pre-Operational period, lasts from age two to age six, and marks the ability to form mental symbols. The Concrete-Operational period, ages seven to eleven, is characterized by the beginning of logical thought development; the child classifies, orders, and counts objects and events which he can actually perceive. Finally, period four, the Formal-Operational period, ages twelve to fifteen, is attained. This last stage is characterized by the ability to reason hypothetically; to use propositional logic or logical inference; to use arbitrary symbols allowing the individual to dissociate from context; and to use combinational thought.

Piagetian theory holds that the attainment of formal operational abilities during adolescence (period 4) is a durable achievement; thus, once mastery of cognitive abilities has been achieved, these abilities are maintained throughout the remainder of the life-span. In fact, the issues of cognitive development in adulthood and middle age were never even addressed by Piaget. Only incidentally did he discuss possible intellectual evolution in the years from 15 to 20, only then suggesting that the formal operations may be reached at different times by different adolescents, depending on factors such as aptitude and professional specializations. However, he considered formal operations to be final state--final in the sense that it is not modified during the life-span. It would thus follow that Piaget would not predict cognitive changes--regression either--during the later years of life.

Extension of Piaget's Theory

One of the leading interpreters of Piaget, John Flavell, suggests that the research generated on childhood cognitive development can serve as an anchoring point as well as source of illumination for considerations of cognitive change in adulthood (2). Childhood intellectual changes have some characteristic properties: change is inevitable; the changes are of immense cope and significance; they occur in fixed order; and they are largely irreversible and permanent. Adult cognitive changes, however, different from the above because biological changes, if any, are different and less likely to dictate a set of cognitive changes.

Adult changes, according to Flavell, are probably irreversible; probably directional, but without developmental landmarks; more quantitative than qualitative; and probably do not occur in all adults.

While Piaget links cognitive growth to neurological factors, Flavell argues that such growth may be not only based on biological factors but on experience as well. According to Flavell, experience is a promising source of interesting adult cognitive changes, far more promising than are biological events. Experience may be synonymous with environmental stimulation. It may be programmed or unprogrammed and may include all social and interpersonal experience. In fact, social interaction is what causes learning to take place.

Flavell concedes that experiences in adults vary widely. He suggests that differences may exist in rate and intensity of cognitive development in adulthood, since varying experiences may have various degrees of intensity for adults. Research is needed to determine if there are common experiences in adulthood contributing to cognitive growth.

Some of Neugarten's research focusing on middle age and aging has shown that some common experiences are associated with particular points in the life stream (3). For example, she purports that there is a gradual reversal across adulthood in the way biological time is perceived, that is from time-since-birth to time-left-to-live. Also there appears to be a shift from active-assimilatory to passive-accommodatory model in coping with the environment as people pass into older age. These findings could stimulate other important research in the area of adult cognitive development.

Obviously, most of the support for the traditional Piagetian position concerning youthful development and maintenance of the formal operations stage comes from studies based on adolescent samples. A few studies on adult samples that support the traditional view also have been reported, but the bulk of the research using adult subjects contradicts the traditional position that formal operations are necessarily attained in adolescence and are maintained throughout adulthood.

College students have been used as subjects in a number of studies that indicate formal operations are not necessarily attained or maintained. Arlin (4), in a 1975 investigation of 60 female college seniors, determined that only 31 of the subjects were classified as formal thinkers. Among a sample of college freshmen, McKinnon & Renner (5) in 1971 administered five Piagetian tasks and found only 25% to be formal operational. Renner and Stafford (6) studied 44 randomly selected first and third year law students in 1972. They found only 86% of the students to be formal operational on one task of formal operations, only 79% on another. Studies such as these offer serious challenge to the view that the fourth stage of cognitive development is completely achieved at adolescence, even among intelligent persons.

Although Piaget's theory allows for hierarchically successive stages, he developed the concept of "decalage" which explains minor disparities between cognitive stages. The term is employed to indicate that a person may use reasoning appropriate to a lower level of cognition in one area or problem, while using reasoning at a higher level in another.

"Negative" or "reverse" decalage has to do with a person's reasoning trends' moving from a higher to a lower level. Some investigators have suggested that this pattern is related to regression in old age. They have studied operational thought among the elderly and note a pattern of reversal of early development, in that some cognitive abilities appear to decline in the same order in which they were acquired.

Measurement of Skills à la Piaget

Much of the research on cognitive task performance in adulthood and old age has focused upon performance on conservation tasks of various types. Conservation in intellectual thinking has to do with the ability to maintain the qualities of a phenomenon, even though the substance is changed. Typically, the conservation task involves giving the subject two items (usually clay balls) of the same size, then removing one and forming an object with it, and when presenting it to the subject again assessing his ability to determine whether the two items are still equal (test of mass conservation), or if they occupy the same space (test of volume conservation).

Support and Contradiction of Reverse Decalage Theory

Several investigators have explored both the presence and absence of reverse decalage in older persons, using Piagetian tasks of conservation. Papalia (7) studied conservation skills of subjects over 65 years of age and found that the tasks assessing the more complex abilities--volume conservation--were not achieved by a large number of subjects, while the

less complex tasks tended to be easier for them. This research may lend support to the theory that the more complex conceptual abilities appear to disintegrate in the older adult prior to the less complex ones. In another investigation, Papalia, et al. (8), who studied subjects between the ages of 63 and 85, concluded that conservation of substance, weight, and volume is not an intact ability for many persons across the life-span. This study lends further support to the theory that skills during later life disappear in the reverse order of their acquisition. These findings were corroborated by an investigation by Storock, et al. (9) who found performance by older adults to be optimal on weight conservation measures, but consistently poorer on volume conservation, the more complex measure of formal opertional thought.

Some researchers have attempted to determine whether there is a correlation between Piagetian measures of intelligence and the "fluid" factor of intelligence. Fluid intelligence is that factor which describes abilities having neurophysiological bases, reflecting gene-related differences. Fluid intelligence is relatively uninfluenced by culture, experiental learning, and specific life experiences. Some task requirements for assessing fluid intelligence include psychomotor speed and inductive reasoning. Horn's (10) research indicates that fluid intelligence increases until about age 14 or 15, then declines gradually and steadily. This research would thus lend support to the theory of reverse decalage.

Although considerable support exists for the position that logical thinking concepts decline in later life in the same order in which they were acquired, some significant research has been generated lately to contradict the theory. Hughston and Protinsky (11,12) have reported studies among older men and women, conducted in 1978 and 1979; and they found that there is not necessarily a decline in conservation abilities, thus concluding that regression in later life does not occur. Tesch, et al. (13) further corroborated these findings in a study investigating age differences in spatial and communicative egocentrism among adults, in which no evidence of regression was found.

Conclusions With Implications for Further Research

Piaget's theory of cognitive development has been explored by a number of researchers, many of whom have attempted to verify and refine the theory. Only recently, nowever, have developmental psychologists extended efforts to apply Piaget's concepts to mature and aged adults. Even so, the research has yielded conflicting results. While studies have supported the view that formal operational thinking is fully developed at adolescence, other significant research has contradicted this theory. And investigation of the theory of reverse decalage during the later years has also yielded conflicting results.

Since the research is still rather limited in scope, the conclusions are necessarily only tentative. It might seem reasonable to assume, however, that subjects tend to vary considerably in their abilities to solve problems of logical operations. And while evidence is conflicting, there is more

favoring decline in the later life than not favoring it. The data explaining reasons for differences in abilities are very limited. Among the factors might be educational differences, environmental setting, tasks persons are asked to perform, and social and experiential influences.

Caution should be exercised in interpreting findings of studies which show age differences in conservation performance since most of the studies have been cross-sectional. More longitudinal analysis is required before it can be determined conclusively that such abilities were once present and actually declined with age. Since many Piagetian tasks employ mathematic and scientific models there may also be a question as to the validity of such measures with the older adult.

Further controlled research needs to be forthcoming to determine what influence a variety of factors might have on studies among middle aged and older adults. Among the variables to be considered are cohort differences, educational and occupational background, socio-economic background, amount of social activity, degree of regular intellectual activity, and neural degeneration. Finally, still another important area to be explored is the determination of whether it is possible to reinstate certain cognitive abilities in adults who appear to lack them in a testing situation.

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